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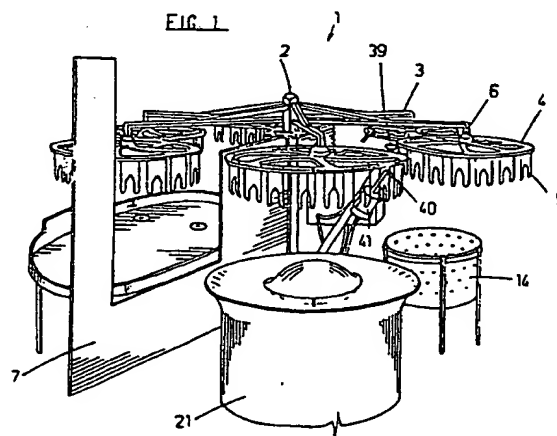
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AT BE CH DE FR IT LI LU NL SE(71) Applicant: James Winstone Ryan
166 Catherine Street
Invercargill(NZ)(72) Inventor: James Winstone Ryan
166 Catherine Street
Invercargill(NZ)(74) Representative: Day, Jeremy John et al,
REDDIE & GROSE 16 Theobalds Road
London, WC1X 8PL(GB)

(54) Poultry abattoir apparatus.

(57) Poultry abattoir apparatus having a central support (2) from which a plurality of rotatably supported arms (3) radiate. A multi position chicken holding carousel (4) is supported on each said arm and each carousel is caused in turn to move past a killing station, a scalding station (21), and a plucking station (14). Two or more operations may take place on different carousels but simultaneously.



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POULTRY ABATTOIR APPARATUS

This invention relates to poultry abattoir apparatus.

Mechanisation of poultry abattoirs is well known with sophisticated equipment designed to handle many thousands of birds each day. There are however many situations where the number of birds available for slaughter does not justify installation of automatic handling equipment. However even with smaller numbers of birds any automation which can be introduced will be labour saving allowing for a more efficient operation of such small type abattoir installations.

It is broadly an object of the present invention to provide poultry abattoir apparatus designed to enable some automation to be introduced into abattoir equipment designed for relatively low numbers of through-put.

Accordingly the invention consists in poultry abattoir apparatus comprising a central support means, a plurality of rotatably supported arms radiating from said central support means, a chicken holding carousel mounted at the same distance from the central support means on each said arm, a killing station, a scalding station, and a plucking station with the carousels on each arm being moved successively through said stations and with two or more operations taking place on different carousels but simultaneously.

One preferred form of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a pictorial view of apparatus
5 according to the present invention,

Figure 2 is a partly diagrammatic plan view of the apparatus showing the relative locations of stations,

Figure 3 is a detailed view showing one type of
10 advancing drive,

Figure 4 is a further detailed view showing the plucking station,

Figure 5 is a section elevation through a scalding used in the present invention, and

15 Figure 6 is a further sectional view at right angles to the view as illustrated in figure 5.

Poultry abattoir apparatus 1 comprises a central support provided in the illustrated form of the invention by a column or upstand 2 from which are
20 rotatably supported a plurality of radial arms 3. It will be appreciated the invention may equally well be applied where the column is replaced by a hanger for example suspended from a suitable support structure.

25 In the illustrated form of the invention six equally spaced radial arms 3 are provided. It would also be possible to design the apparatus with five equally spaced arms.

Each arm 3 has dependent from the end thereof a
30 chicken carrying carousel 4 so that each such carousel is located an equal distance from the central support point. Once again the construction of the carousel can be varied both in detail of mechanical design and also in size. The carousel may be as small as
35 is necessary to hold five birds or as large as is

necessary to hold 20. Larger carousels could be designed but will begin to exceed the numbers of birds which are suited for processing by this type of apparatus.

5 The apparatus as illustrated in the drawing depicts a larger type of the carousel having a 20 bird holding capacity. The carousel is preferably made up of the wheel type assembly, for example cast from aluminium or other suitable metal with spokes
10 radiating to a rim from which are suspended fixed bird carrying shackles 5. Thus each bird carrying carousel 4 is rotatably supported on the end 6 of its respective radial arm 3.

15 A dividing baffle or wall 7 is located essentially separating the apparatus in half. This dividing baffle is a hygiene requirement demarking a separation between the various operating stages in the process as will be detailed herebelow. It clearly is not an
20 essential feature of the invention and as will be apparent from the drawing in figure 1 the baffle must include wide openings to allow for the movement of the carousel there through during rotation about the central support 2.

25 With reference to figure 2 the various operating stations in the process will now be identified. The carousel at position 8 would be normally used for hanging birds removed from a crate or other normal receptacle so that they are suspended while still
30 alive in the inverted position with their legs engaged in the bird carrying shackles 5. In this position the birds normally quickly assume a relaxed state and may be advanced to the next station 9 which is the killing station. A single operator would be able to remove the birds from the crate,
35 load the carousel at 8 and also kill the birds once

the carousel has been advanced to station 9. Killing is normally done by cutting the main vein in the neck of the bird and allowing the bird to bleed to death. Thus a bleeding tray 10 is located beneath the killing station 9 and what has been identified as the bleeding station 11 which is the next step of advancement as the carousel moves through the various operating stations.

Station 12 is the scalding station where the birds that have been allowed to bleed are immersed in scalding water for the appropriate treatment time. The scalding apparatus designed for the present invention will be described in greater detail herebelow.

The birds are then advanced to station 13 which is identified as the plucking station. The birds that have been scalded are removed from the shackle and dropped into a plucker 14.

Again this aspect of the operation will be described in greater detail herebelow.

The final station or sixth position 15 is essentially a spare station although it can be used to remove legs where a cut off saw is in action at the plucking station. It may also be used as a cleaning station if it was felt hygiene required the carousel to be cleaned prior to the next cycle through the stations as just identified.

As will be clear from the above description it is necessary to advance the carousels in a step by step sequence through the operating stations. It is also important to ensure the carousel is correctly located and held in place at the station during treatment. In the simplest form such rotation may be achieved by a man releasing a mechanical lock and advancing all of the carousels one position, prior

to re-engaging the mechanical lock so that the carousels will remain in that position until the lock is released and the next advancement step taken.

There is clearly advantage in having an automated step drive incorporated particularly with the larger type of apparatus as illustrated. Such a step type drive is detailed in figure 3 where a pneumatic ram 16 has the driving head 17 designed to engage with stops 18 appropriately spaced about the rotating head supported on the column 2. Actuation of the ram 16 is controlled through an appropriate control circuit to cause the head 17 to engage with a stop 18 and advance the head so that the carousels move one step around the processing path. As mentioned a lock is introduced and this can be provided by a mechanical catch 19 into which an arm 3 in the illustration shown in figure 4 at the plucking station will engage. A lead in or guide bar 20 directs the arm 3 into the catch 19 so that it is firmly held in place. This whole assembly can be released for example by a small pneumatic cylinder pulling the arm down when the operating cycle is at a stage which will allow for the next movement of the carousels through the processing steps. It will be apparent that other type of drive means may be used and other types of locking mechanism could also be included without departing from the present invention.

The scalding 21 forms an important part of the present invention and this is illustrated in more detail in figures 5 and 6 of the accompanying drawings. The scalding 21 comprises an outer cylindrical container 22 having a central section 23 together defining an annular chamber 24 in which the birds to be scalded can be immersed in scalding water. The central section 23 has a top 25 so that any water falling

thereon must be directed into the annular chamber 24. A deflector head 26 is located above the base 25 and has a downwardly directed cone section 27 located immediately above a water discharge 28. This water
5 discharge or inlet point is connected via a large diameter pipe 29 and pump 30 to a water collection point 31 in the base of the receptacle 24. The pump 30 is driven through an appropriate drive shaft 32 by a motor 33, thus in use when the pump is operating
10 the flow of water is caused to be drawn in at 31 and discharged at 28 to be divided by the cone 27 and distributed substantially equally about the annular chamber 24 delivering a downwardly directed flow of water into the chamber 24.

15 In the base of the chamber 24 is located a pipe 34 which allows for the injection of steam into the water to control the temperature at which the water in the chamber 24 is maintained so that by use of appropriate control equipment the optimum scalding
20 temperature for the birds being processed can be maintained.

The whole of the above described apparatus is supported on a hydraulic ram 35 extending from the support surface up into the space in the centre of
25 the apparatus just described. A pump 37 as shown in figure 6 is driven via a belt drive 38 from pulleys 39 on the shaft 32 and upon opening of appropriate valve means a flow of water can be delivered by the
30 pump into the cylinder 35 causing the apparatus to be raised from a lowered position where it is free from any bird suspended on the bird carrying shackles to a raised position where the birds are immersed in the scalding flow of water while still supported on the shackles.

The scalding 21 must be incorporated in control circuitry such that it cannot be raised until the carousel has been locked in position. Control equipment will also need to regulate the temperature of the water in the scalding and the time the scalding is held in the raised position with the birds immersed therein. After the appropriate time the scalding will once again be lowered to the position as shown in figure 1 of the drawings and the carousels may be advanced one further position.

The scalded birds are then advanced to the plucking station. With the preferred form of the apparatus the timing of the various operations is such that the plucking step is considerably shorter in time than the scalding step. For this reason a small rotary plucker 14 may be used but processing only part of the birds held on the carousel. The plucker may operate a number of sequences before the scalding station has completed its cycle of operation and this allows for a smaller plucker to operate effectively.

When the carousel advances to the plucking station it also engages with a driving head 39 powered by a motor to cause the carousel to be rotated in a controlled manner. A friction drive onto the periphery of the carousel rim will normally be sufficient. The scalded birds are preferably dropped from the shackles into the plucker by causing a cut-off saw 40 driven by a motor 41 to cut the birds legs leaving the legs supported in the shackles and dropping the body of the bird into the plucker. This type of apparatus is well known and is not detailed herein.

Control equipment can record the number of birds by counting protruberances extending from the shackles, for example one arm of the shackle can be connected

to extend above the rim of the carousel and this can actuate for example a micro switch thereby allowing the control equipment to record the number of birds which have been delivered into the plucker. When the
5 required number of birds have been so delivered the drive 39 will stop and the plucker cycle commenced. The plucker cycle when finished will allow the door to the plucker to be opened discharging the birds which can then be placed onto an eviscerating line normally operated in association with this equipment,
10 but not forming part of the present invention. Once the birds have been discharged this cycle would be repeated three or four times until the birds on the carousel have all been removed and at that time the sequencing may allow the carousels to be advanced
15 through the next step.

As will be apparent from the foregoing the present invention normally requires two operators. One operator will hang the birds and kill them, the other operator will load the eviscerating line with
20 birds from the plucker and remove legs from the shackles prior to being delivered through the baffles
7 for the next cycle of operation.

CLAIMS

1. Poultry abattoir apparatus comprising a central support means, a plurality of rotatably supported arms radiating from said central support means, a chicken holding carousel mounted at the same distance from the central support means on each said arm, a killing station, a scalding station, and a plucking station with the carousels on each arm being moved successively through said stations and with two or more operations taking place on different carousels but simultaneously.
2. Apparatus as claimed in claim 1 wherein at least five radial arms extend from said central support means with five separate stations comprising in turn a hanging station, a killing station, a bleeding station, a scalding station and a plucking station.
3. Apparatus as claimed in claim 1 or claim 2 wherein six equally spaced arms radiate from the central support means with one carousel at any one time not located at a operating station.
4. Apparatus as claimed in any one of the preceding claims wherein said central support means comprises a column or upstand from which the arms are rotatably supported.
5. Apparatus as claimed in any one of claims 1 to 3 wherein said central support means comprises a suspended hanger from a suitable structural support, said hanger having rotated therefrom the plurality of arms carrying said carousels.
6. Apparatus as claimed in any one of the preceding claims wherein each said carousel incorporates between five and twenty, preferably between fifteen and twenty equally spaced bird carrying shackles about the periphery thereof.

7. Abattoir apparatus incorporating a baffle or wall means dividing the hanging, killing and bleeding stations from the scalding and plucking stations.

8. Poultry apparatus as claimed in any of the preceding claims incorporating a drainage tray to collect blood from the birds on the carousel located at the killing and bleeding stations.

9. Poultry apparatus as claimed in any of the preceding claims wherein a supply of scalding water is raised to immerse the birds suspended from the shackles on the carousel.

10. Poultry apparatus as claimed in claim 9 wherein said poultry scalding comprises an annular open top chamber adapted in use to receive a plurality of feathered birds located on said shackles of said carousel, a flow director located between the inner edges of the annular chamber to divert a downwards flow of water onto the birds in use in the chamber, water outflow means at or adjacent the base of the chamber and water inflow means directed on to the flow distributor, a pump circulating the water through the water outlet and flow deflector into the chamber to be drawn out through the water outlet, heating means to heat the water and temperature control means to control the temperature of the water being circulated.

11. Poultry apparatus as claimed in claim 10 including a hydraulic cylinder to raise the annular chamber from a lowered position free from the bird supported on the carousel to a raised position with the birds immersed in the annular chamber of said scalding.

12. Poultry apparatus as claimed in claim 10 or claim 11 wherein the lifting ram for the scalding is mounted from a support surface to project upwardly into the central space surrounded by the annular scalding chamber.

13. Poultry apparatus as claimed in any one of claims 10 to 12 wherein the water in the chamber in use is kept at the required temperature by injection of live steam through pipes located at or adjacent the base of said annular chamber.

14. Poultry scalding as claimed in any one of claims 10 to 13 wherein said flow divider comprises a couling having an inverted coned section located above the water outlet to operate as a flow spreader and guiding means directing the flow of water so that it is discharged into the annular chamber with a downwards direction.

15. Poultry apparatus as claimed in any one of claims 10 to 14 wherein the radial arms carrying the carousels can not be rotated when the scalding is in the elevated position.

16. Apparatus as claimed in any one of the preceding claims wherein plucker station incorporates means to remove the scalded birds from the shackles for discharge into a plucker, said separation means comprising a cut off saw cutting through the legs of the suspended chicken and allowing the remainder of the birds to fall into the plucker.

17. Apparatus as claimed in claim 16 wherein the carousel at the plucking station is rotated with control mechanism limiting the degree of rotation and also controlling the operation of the cut-off saw so that the required number of birds are discharged into the plucker and the plucking cycle is completed before further rotation of the carousel for treatment of any remaining birds.

18. Apparatus as claimed in any one of the preceding claims wherein the carousels are automatically advanced from one station to the next by a drive means advancing in a step by step motion the carousels

between the stations and with a lock mechanism operating to lock the radial arms in place when correctly located at the stations.

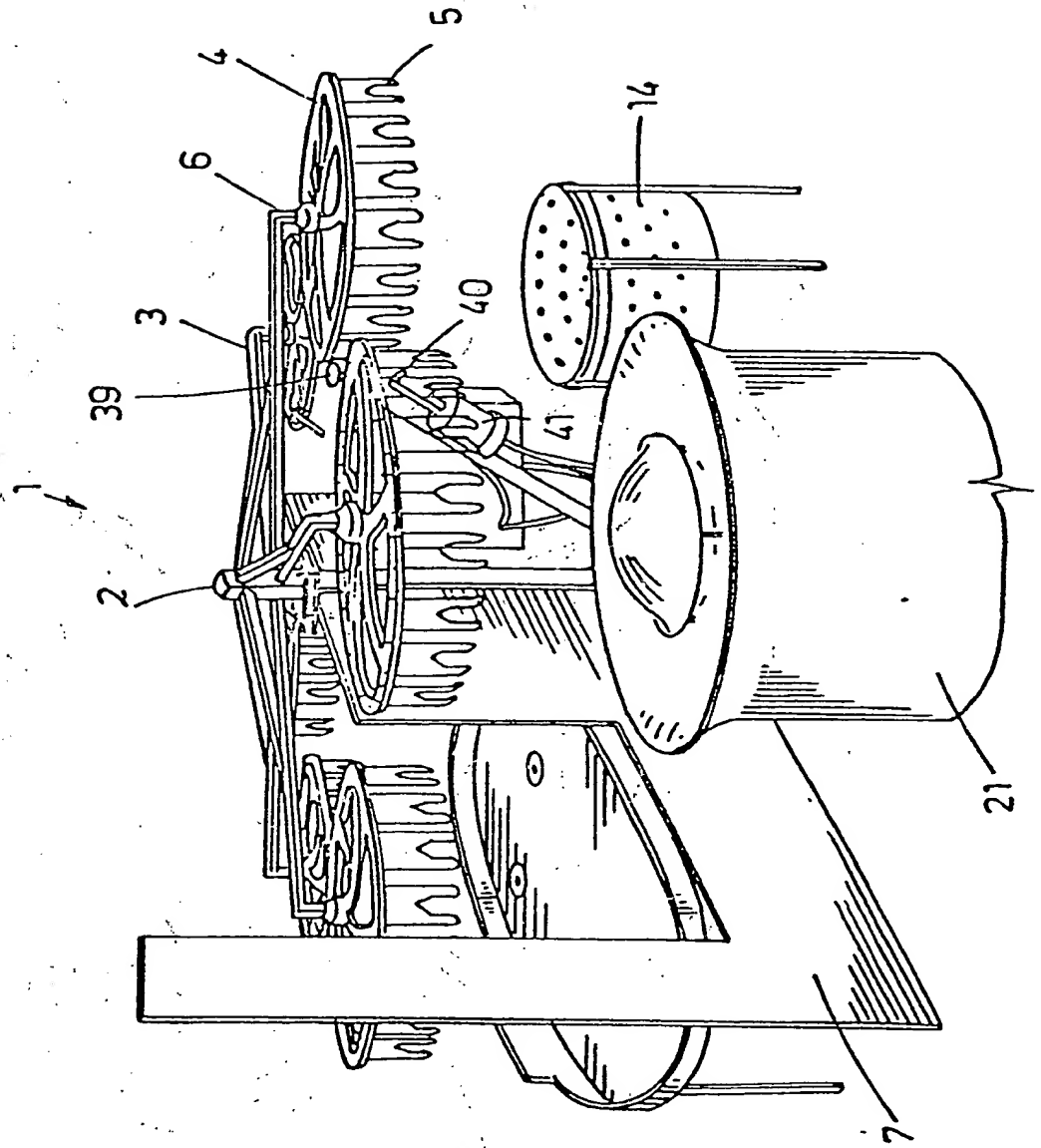
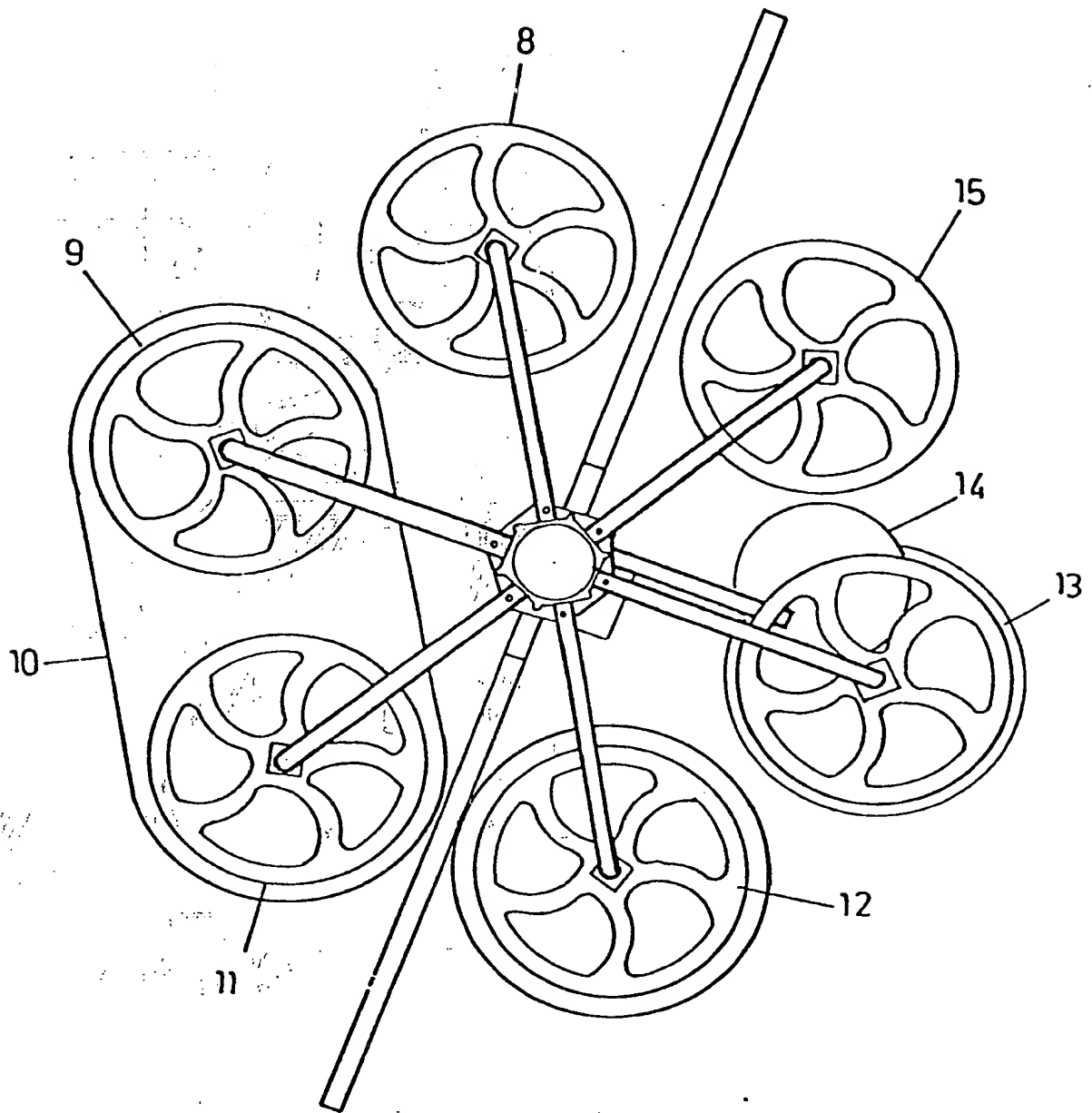
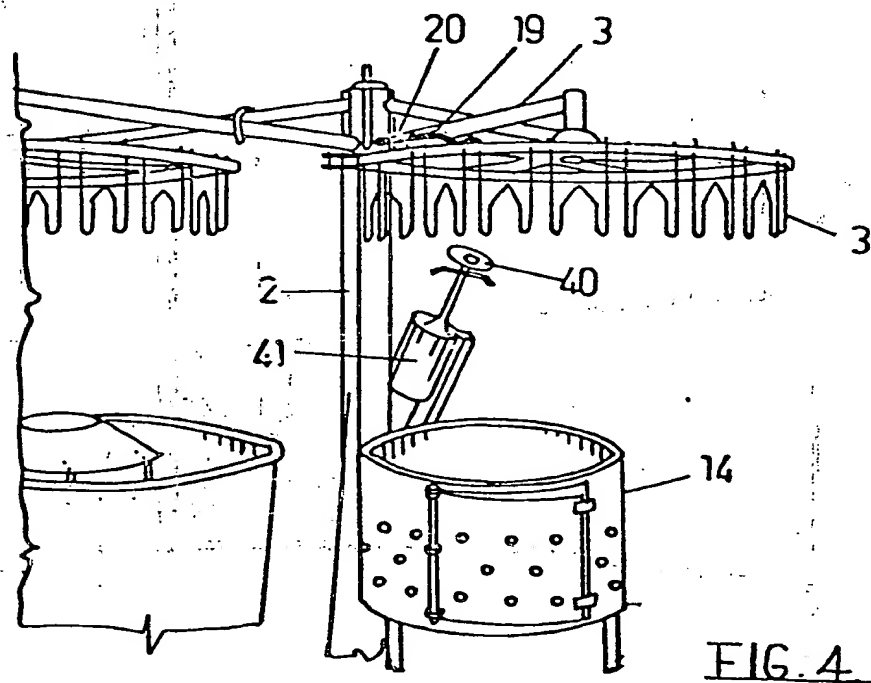
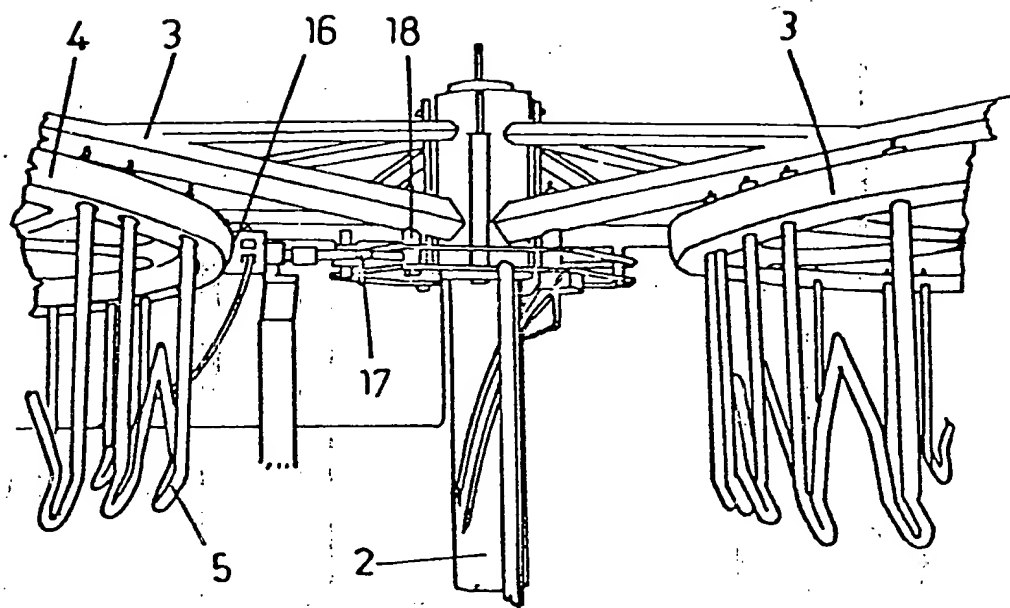
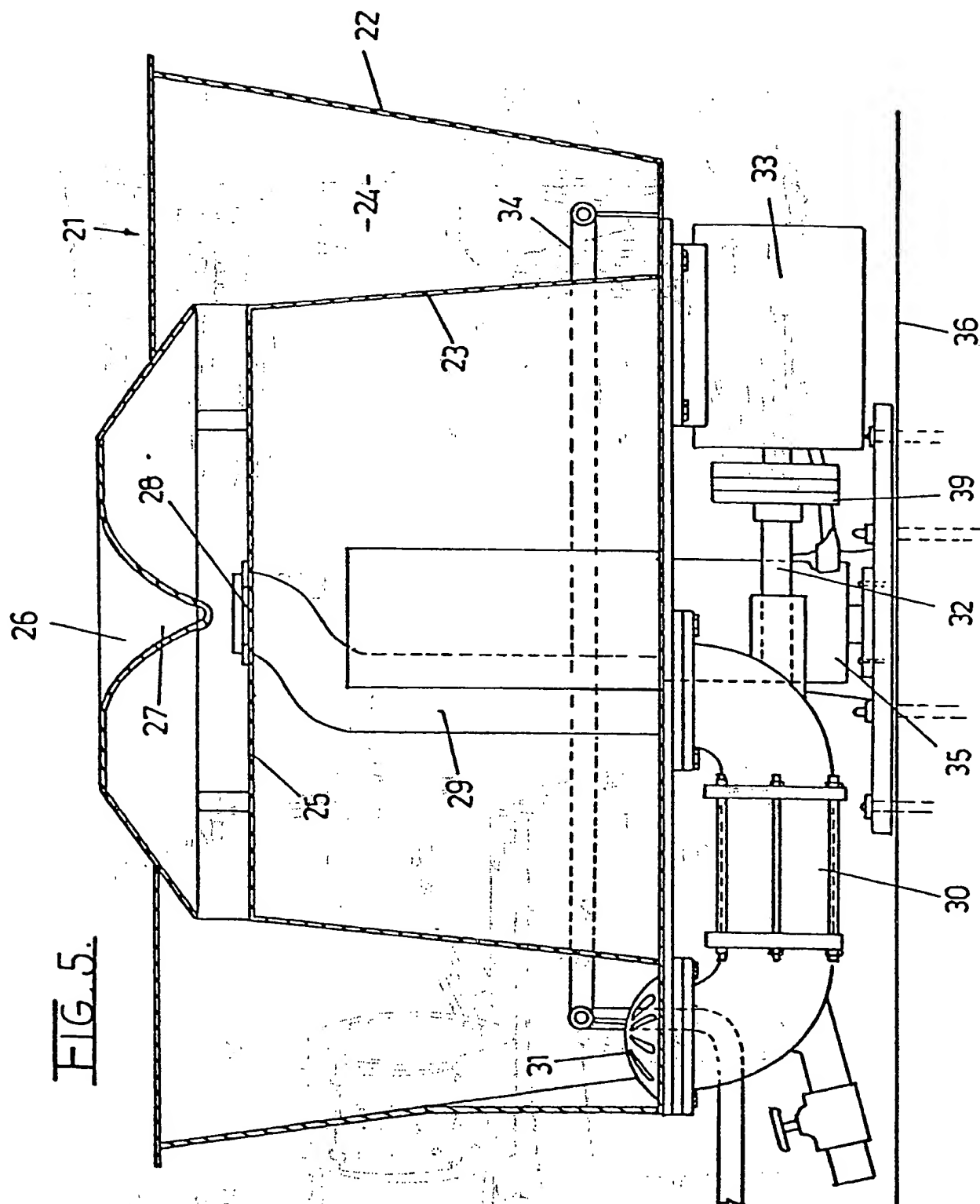


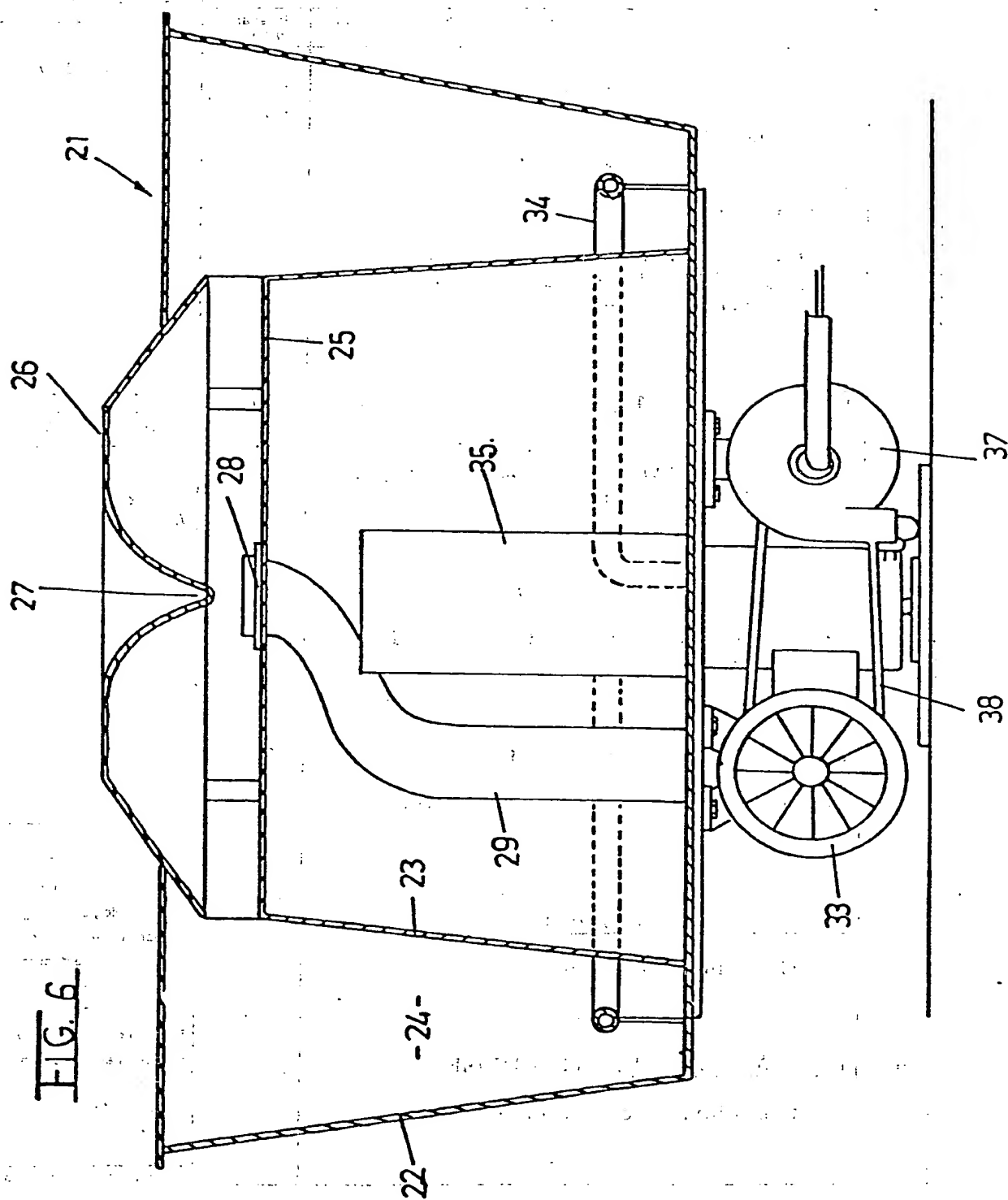
FIG. 1

FIG. 2











DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 1)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<p>FOOD ENGINEERING, vol. 27, October 1955 NEW YORK (US) R. BERNICK: "Zips Feathers from 7500 Birds per Hour" pages 107-224</p> <p>* Page 107, right-hand column; page 224, left-hand column, paragraphs 1-3 *</p>	1, 2, 8, 16	A 22 C 21/00
	<p>GB - A - 721 419 (COPE, WHELON & CO.)</p> <p>* Page 1, line 44 - page 2, line 3; claims 1-5 *</p>	9, 10, 13, 14	TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
	<p>US - A - 2 855 624 (JEROME)</p> <p>* Column 2, lines 21-45; claims 1-3 *</p>	16	A 22 C A 22 B
	<p>US - A - 3 777 886 (SMITH)</p> <p>* Column 6, line 65 - column 7, line 30 *</p>	18	
A	<p>US - A - 1 637 096 (ALLEN)</p> <p>* The whole document *</p>	1	CATEGORY OF CITED DOCUMENTS
A	<p>FR - A - 700 434 (BERTHOME)</p> <p>* The whole document *</p>	1	<p>X: particularly relevant</p> <p>A: technological background</p> <p>O: non-written disclosure</p> <p>P: intermediate document</p> <p>T: theory or principle underlying the invention</p> <p>E: conflicting application</p> <p>D: document cited in the application</p> <p>L: citation for other reasons</p>
<p>The present search report has been drawn up for all claims</p>			<p>&: member of the same patent family, corresponding document</p>
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